

NON-PUBLIC?: N
ACCESSION #: 8805230047
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Kewaunee Nuclear Power Plant PAGE: 1 of 3

DOCKET NUMBER: 05000305

TITLE: Communication Difficulties During the Implementation of New Condenser
Hotwell Flush Procedure Results in Reactor Trip
EVENT DATE: 04/12/88 LER #: 88-004-00 REPORT DATE: 05/12/88

OPERATING MODE: N POWER LEVEL: 023

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: David S. Nalepka - Plant Licensing Supervisor
TELEPHONE #: 414-388-2560

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT: At 0215 on 4/12/88 while the plant was at 23% reactor power in a startup following the cycle XIII-XIV refueling outage, a low condenser hotwell level of approximately 5% caused a condensate pump trip, an associated feedwater pump trip, and then a turbine/reactor trip. These actuations occurred during a secondary plant flushing evolution. This is a post-outage special procedure which flushes contaminants from secondary plant piping and the condenser that may have been introduced into the secondary system during the refueling outage.

The secondary plant piping was flushed twice, and then the condenser was flushed 5 times. During the final condenser flush at 23% power, the hotwell level decreased to approximately 5%. At approximately 5% level the condensate pump tripped due to the low hotwell level. This pump trip ensures adequate net positive suction head is maintained for the condensate pump.

The cause of the event was a combination of the procedure requiring local valve manipulations outside of the control room, communication difficulties, and the rapid rate of decrease in the hotwell level. This combination resulted in the hotwell level decreasing to below the condensate pump trip setpoint. The condensate pump trip resulted in an associated feedwater pump trip followed by a turbine/reactor trip.

As a corrective action potential hardware changes which would limit the number of remote valve manipulations required to be performed outside of the control room are being evaluated.

(End of Abstract)

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Description of Event

At 0215 on 4/12/88 while the plant was at 23% reactor power in a startup following the cycle XIII-XIV refueling outage a reactor (RCT) trip occurred. The trip occurred when a low condenser (COND) hotwell level of approximately 5% caused a condensate pump (P) trip, an associated feedwater pump (P) trip, and then a turbine (TRB)/reactor trip. These actuations occurred during a secondary plant flushing evolution. This is a post-outage special procedure which flushes contaminants from the secondary plant piping and the condenser that may have been introduced into the secondary system during the refueling outage.

The condensate system (SD), together with the heater drain (SN) pumps (P), is designed to provide the flow and suction head required for the feedwater system (SJ). The number of operating condensate pumps must be equal to or greater than the number of operating feedwater pumps. The feedwater pumps operate in series with the condensate pumps and depend on the condensate pumps for a continuous water supply to their suction. The feedwater pump trip is interlocked to the condensate pump trip to ensure flow and a corresponding adequate net positive suction head to the feedwater pumps. The condensate in the condenser hotwell provides the suction head required for the condensate pumps. The low condenser hotwell level trip function will prevent possible condensate pump cavitation which might occur due to the decreasing hotwell level.

The hotwell was filled initially to 25% level for a piping flush. The normal condensate level at full power is 68% with a low-level alarm set at 43%. The condenser's automatic makeup valves (LCV), emergency makeup valves (LCV), and dump valves (LCV) were manually isolated. The hotwell was then dumped to the turbine building (NM) standpipe. The procedure required that the hotwell dump be terminated prior to reaching a hotwell level of 10% (approximately 5% above the condensate pump trip setpoint). The hotwell level is dumped to the level of 10% to provide effective cleanup of the system. Also, the fill level is 25% to conserve condensate and concentrate the contaminants.

The piping flush was performed twice with approximately 26,160 gallons being dumped from the condenser to the turbine building standpipe and from

the standpipe to the lake. The warming of steam lines was then commenced in preparation for the condenser flushes and a gradual power escalation was initiated. The hotwell level of 25% was obtained and the hotwell was dumped to the turbine building standpipe until the hotwell level dropped to 15%. Actions were being initiated at 15% level to provide margin to the 10% level specified in the procedure. The level was returned to 25% and the process was repeated. The fifth and final flush was initiated at a reactor power level of 23%. The control room supervisor noticed that the hotwell level had decreased to less than 15% at which time he directed the operator to close the dump valve. The operator had closed the dump valve and was proceeding to open the makeup valve. Due to perturbations in level occurring in the hotwell the level dropped below 5.25% causing a condensate pump trip. This in turn caused a feedwater pump trip which resulted in a turbine/reactor trip.

The auxiliary feedwater (BA) pumps (P) started as required. All systems functioned as designed.

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Cause of Event

The event was caused by the procedure which as written requires operation of valves for the dumping and flushing of the condenser that are not controlled from the control room. The operator is required to manipulate valves locally based on communications from the control room. The location of the communication system (Gaitronics) and the locations of the valves to be locally manipulated can result in communication difficulties. The dump valve is located in the basement of the turbine building and the makeup valves are located on the mezzanine level of the turbine building. The location of these valves requires the operator to move from one valve to the other during the dumping and refilling process. In addition, the amount of time between the minimum level (10%) of the procedure and the trip setpoint (approximately 5%) is relatively short (2-5 minutes depending on the dumping rate).

Since this was the first experience with this procedure at the Kewaunee Plant, operator familiarity with hotwell level response during this evolution was minimal. The low-level alarm for the hotwell level provided no warning to the operator because the procedure was being implemented at a hotwell level below the alarm setpoint and the alarm was already actuated.

Analysis of Event

This event is being reported under 10CFR 50.73 (a)(2)(iv) as an actuation of the Reactor Protection system (JC) (RPS) and Engineered Safety Features

(JE) due to the reactor trip and auxiliary feedwater pump start. Since the RPS and the auxiliary feedwater system functioned as designed during and after the trip, there were no adverse safety consequences due to this event.

The plant was in hot shutdown following the trip. The reactor was returned to criticality at 0451 the same day and the turbine/generator was connected to the grid at 0620.

Corrective Actions

Potential hardware changes are being evaluated which would allow the procedure to be implemented from the control room by limiting the amount of local valve manipulations.

Additional Information

Equipment Failure: None

Similar Events: None

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NRC-88-71

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U. S. Nuclear Regulatory Commission

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Gentlemen:

Docket 50-305

Operating License DPR-43

Kewaunee Nuclear Power Plant

Reportable Occurrence 88-004-00

The attached Licensee Event Report for reportable occurrence 88-004-00 is being submitted in accordance with the requirements of 10 CFR 50.73, "Licensee Event Report System."

Sincerely,

/s/ E. R. Mathews for
D. C. Hintz
Vice President - Nuclear Power

TJW/jms

Attach.

cc - INPO Records Center
Mr. Robert Nelson
US NRC, Region III

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